Oct. 5, 1926. 1,602,037

L. N. D. MIXSELL

AMMUNITION FOR TRENCH MORTARS

Filed Feb. 5, 1924

Fig. 1.

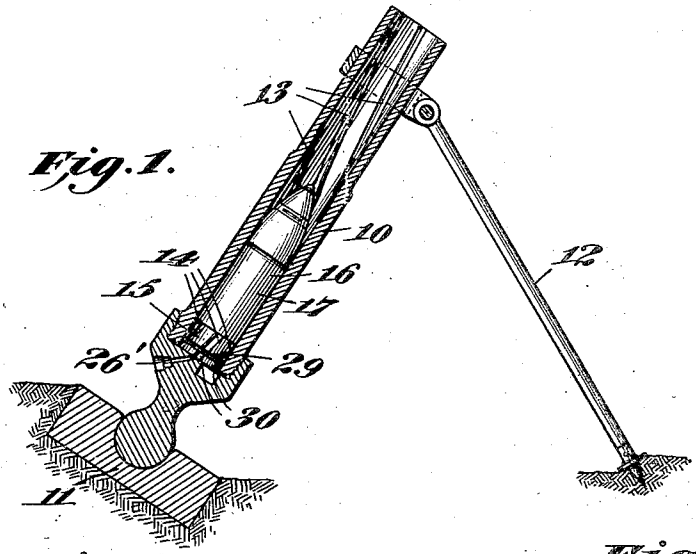


Fig. 2.

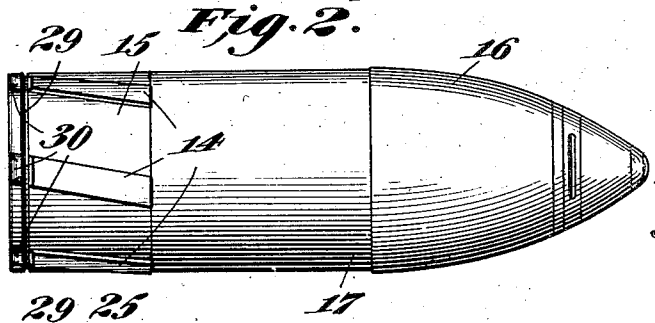


Fig. 4.

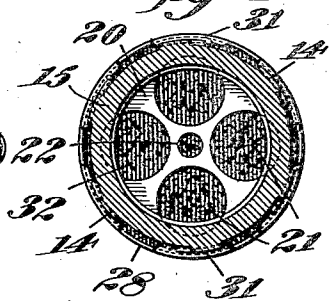


Fig. 3.

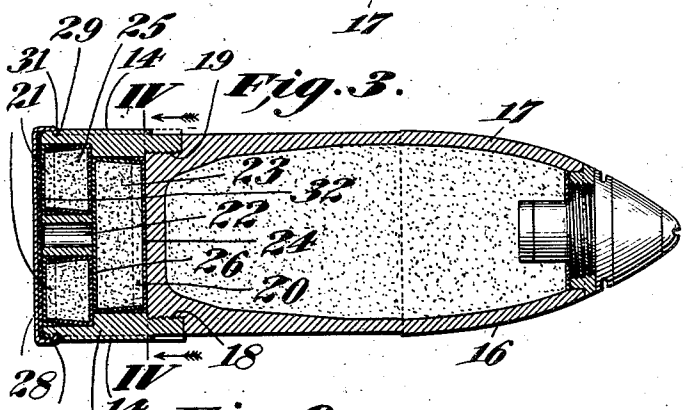


Fig. 5.

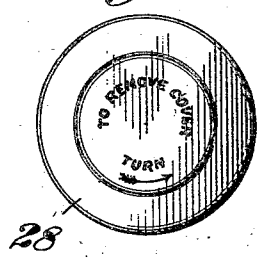
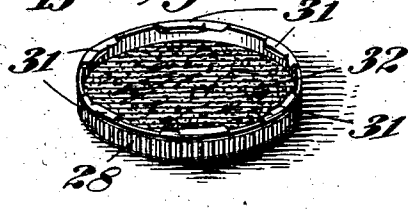


Fig. 6.



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Patented Oct. 5, 1926. 1,602,037

UNITED STATES PATENT OFFICE.

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AMMUNITION FOR TRENCH MORTARS.

Application filed February 5, 1924. Serial No. 690,726.

My invention relates to mortars, more particularly of the trench type, and it has for an object to rifle or provide the mortar bore with interior helical grooves and to provide the projectile with lands to fit the grooves or rifling, whereby the projectile may be loaded at the muzzle in the usual way and whereby, upon firing, spinning motion is imparted to the projectile in order that the direction of firing may be more accurately controlled.

A further object of my invention is to provide a separable base member for a mortar projectile, such base member having an upper or main propellant charge chamber and lower supplementary propellant charge chambers communicating with the upper chamber and extending through the bottom of the base member, whereby the amount of supplementary charge may be readily and quickly varied by the gunner to suit conditions.

A further object of my invention is to provide a projectile base member with main and supplementary propellant charge chambers together with charges enclosed in inflammable envelopes or capsules, whereby the base member may be quickly and accurately charged and whereby the amount of the supplementary charge may be readily varied in the field.

A further object of my invention is to provide a base member for a projectile of the type referred to with main and supplementary propellant charge chambers, together with a primer opening so that a mortar may be loaded in the usual manner and fired whenever desired.

A further object of my invention is to provide a mortar projectile with a base member having lands and a circumferential groove near the bottom which intersects the lands to provide lugs behind which fit lugs of a weather-proof cap, the latter fitting against the bottom of the base member to protect the explosive propellant charge while the projectile is being transported.

These and other objects are obtained by my invention as will be hereinafter pointed out in the specification and set forth in the claims.

Apparatus made in accordance with my invention is illustrated, by way of example, in the accompanying drawings, forming a part of this application, in which:—

Figure 1 is a sectional view of a mortar incorporating my improvement and showing a projectile therein having my improved base member;

Figure 2 is a side elevation of my improved projectile;

Figure 3 is a longitudinal sectional view of the projectile shown in Figure 2;

Figure 4 is a sectional view taken along the line IV—IV of Figure 3 and showing the protective cap applied to the base member;

Figure 5 is an end elevation of the apparatus illustrated in Figure 3 and showing the protective cap; and

Figure 6 is a detail view illustrating a protective cap suitable for use with my improved projectile.

Referring now to the drawings more in detail, in Figure 1, I show a mortar 10 of conventional type held in place by suitable supports 11 and 12. The bore of the mortar 10 is provided with a plurality of helical grooves 13 within which are adapted to slide lands 14 carried by the base member 15 of a projectile 16.

Referring to Figures 2 and 3, the projectile 16 includes a base member 15 and an explosive shell portion 17, the base member 15 being preferably provided with an interiorly threaded wall portion 18 adapted to fit over a threaded projection 19 on the explosive shell portion 17.

The base member 15 is generally cylindrical in form and it is provided with lands 14 already referred to, such lands fitting the spiral grooves or rifles 13 of the bore of the mortar in order that spinning motion may be imparted to the projectile 16 as the latter is expelled from the mortar. The lands 14 are preferably helical, although this is unnecessary provided sufficient windage or clearance exists between the sides

thereof and the sides of the helical grooves. A main propellant charge chamber 20 is arranged within the base member 15 and it communicates with supplementary propellant charge chambers 21 which extend through the bottom of the base member. A primer opening 22 extends through the bottom of the base member and communicates with the main propellant charge chamber 20.

The main propellant charge chamber 20 and the supplementary charge chambers 21 are preferably made cylindrical in form to receive charges enclosed in inflammable capsules, the capsule for the main charge 23 being indicated at 24 and the capsules for the supplementary charges 25 being indicated at 26. The amount of the supplementary propellant charge may, therefore, be readily varied by omitting the supplementary propellant charge capsules or by inserting one or more of the latter as conditions may require.

As may be seen from Figure 1, the projectile 16 is inserted at the muzzle and it slides down the bore until it comes to a stop at the breech end of the mortar. In this position, a primer of any suitable type in the primer opening 22 may be operated upon through the firing opening 26' at the breech end of the mortar to explode the main propellant charge; and, if there is a supplementary propellant charge, the latter will be exploded from the main charge. When the propellant charge or charges is or are exploded, the generated gases pass rearwardly through the openings 21 and react against the breech end of the mortar to expel the projectile therefrom.

The base member 15 is adapted to receive a cover 28 which protects the propellant charges while the projectile is in transport or in storage. To this end, I have provided a novel arrangement of the base member to receive a cap of well-known design.

Referring to Figures 2 and 3 it will be seen that the lands 14 are intersected by a circumferential groove 29 so as to provide terminal lugs 30. The cover 28 has inwardly-extending lug or hook portions 31 which are adapted to fit between the lands; and upon turning the cover to a sufficient extent the lugs or hook portions 31 may be brought in position to engage behind the lugs 30 to hold the cover in place.

The cover 28 is lined with any suitable resilient material which effects a tight seal with respect to the base member 15 and which at the same time is of such a character as not to affect the propellant charge. Such a lining is indicated at 32 in Figures 3 and 6, and I have found cork to be suitable for this purpose. The lugs or hook portions 31 fit the lugs 30 with a sufficient degree of tightness and the lugs or hook portions 31 are sufficiently resilient so that the cap 28 is pulled to seat its lining 32 tightly against the bottom of the base member.

From the foregoing, it will be apparent that I have devised a mortar which is safe from the standpoint that it is not automatically fired upon the projectile reaching the breech end and one in which a better degree of direction of control may be exercised due to the rifled effect. Also the arrangement of propellant charge chambers is such that charges put up in inflammable capsules, such as capsules of pyralin, may be readily inserted into the chambers, this feature being particularly advantageous in that a gunner may readily vary the supplementary charge to meet conditions. The lands are made to serve another purpose in that they are notched near the bottom of the base member to provide lugs to receive lugs of a cover.

While I have shown my invention in but one form, it will be obvious to those skilled in the art that it is not so limited, but is susceptible of various other changes and modifications without departing from the spirit thereof, and I desire, therefore, that only such limitations shall be placed thereupon as are imposed by the prior art or as are specifically set forth in the appended claims.

Having thus described the invention what I claim as new and desire to secure by Letters Patent is:—

1. A projectile for mortars including a base member having an intermediate explosive charge chamber and a plurality of supplementary explosive charge chambers communicating with the first chamber and extending through the bottom of the base member.

2. A projectile for mortars including a base member having its upper end interiorly threaded to fit threads on a shell member, said base member having an interior cylindrical chamber and a plurality of supplementary cylindrical chambers communicating with the first chamber and extending through the bottom of the base member.

3. A projectile for mortars including a base member for attachment to a shell, said base member including an upper main explosive charge chamber, a plurality of openings communicating with said chamber and extending through the bottom of said base member, said openings being adapted for the reception of supplementary charges, and a primer opening extending through the base member and communicating with the chamber.

4. A projectile for mortars including a base member for attachment to a shell, said base member including a central upper chamber and lower chambers communicating with the upper chamber and extending

through the bottom of the base member, an inflammable envelope containing an explosive charge in the upper chamber, and one or more inflammable envelopes containing explosive charges in the lower chambers.

5. A projectile for muzzle-loading mortars including a base member having exterior lands and an interior charge-receiving chamber extending through the base member, said lands being notched, and a cap having inwardly-projecting lugs adapted to pass over the base member between the lands and to engage in the notches of the lands upon turning of the cap to hold the latter in place.

In testimony whereof I hereunto affix my signature this 30th day of January, 1924.

LEIGHTON N. D. MIXSELL.